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## ABSTRACT

A statewide telephone survey was conducted in October 1984 with 430 Montanans. The purpose of the survey was to gather information on Montanans' energy conservation activities and attitudes related to domestic hot water heat efficiency, ride sharing, and mobile home weatherization. This data will assist the Montana Department of Natural Resources and Conservation (DNRC) in measuring the effectiveness of their hot water use and mobile home campaigns. In addition, the information will provide the DNRC with baseline data for the ride sharing activities of Montanans. The following sections present a brief summary of the survey results. For a more detailed account, the reader should consult Chapter III of this report.

### Domestic Hot Water Use

To promote energy conservation through improvement of hot water use efficiency, the DNRC sponsored a television advertisement and published a booklet ("Hot Water--Insulate and Save"). The questions in the survey were designed to evaluate this advertising campaign and provide some baseline data on domestic hot water use. The 1980 Montana Census figures for households (285,000) and adult population (600,000) were used to formulate the results in this section.

The following statements highlight the domestic hot water use survey:

- Approximately 40 percent of all Montana households have wrapped their hot water heaters or pipes.
- Of those households that have not wrapped their hot water heaters or pipes, about one-fourth or 45,000 plan to do so in the future.



- Nearly one-half of the adult population in Montana (300,000) saw the television advertisement last winter on wrapping hot water heaters and pipes. None of these people could correctly identify the sponsor as the DNRC.
- The television advertisement was fairly successful in motivating people to lower the temperature on their hot water heaters. However, very few households (about 5 percent) wrapped heaters or hot water pipes because of the advertisement.
- About 7 percent of the adult population in Montana (42,000) thought they had read the booklet "Hot Water--Insulate and Save." This exceeds the number of booklets published (30,000 copies) and indicates an inconsistency or bias. There may be respondent confusion about whether they read the DNRC booklet or other published booklets concerning energy conservation.
- Of the estimated 42,000 Montanans who read the booklet, about 13,500 installed shower water flow restrictors, about 12,000 lowered the temperature on their hot water heaters, and approximately 1,000 have wrapped their hot water heaters or pipes with an insulating material.
- Few Montanans are familiar with the public energy education activities of the DNRC.

### Ride Sharing

Both ride sharers and non-ride sharers were asked questions on ride sharing activities. Following is a summary of the results of these questions:

- About one-fourth of the households in Montana have at least one person who shares a ride to work or college, about the same proportion as reported by the 1980 Census.
- Of these estimated 150,000 households, about 63,000 travel less than 5 miles one-way to work or college, about 39,000 travel between 5 and 15 miles one-way, and 48,000 ride share more than 15 miles one-way. The average (weighted) distance travelled is about 10 miles each way.
- One-half of the Montana households that ride share do so with one person, 30 percent share with 2 people, and 20 percent share with more than 2 people. The average number of riders is 2.8 people including the driver.
- One-half of the ride sharers ride or drive with someone working in the same vicinity, while about 40 percent ride with a family member.



- When merging the responses of the current ride sharer and non-ride sharer groups with regard to their past (1978 and 1983) ride sharing activities, it was found that 19 percent of all respondents reported ride sharing in 1978; 22 percent, in 1983; and 23 percent, today. Given the accuracy of the sample it would appear that the ride sharing frequency has remained stable for the past five years.
- Of the individuals/households who do not currently ride share, 26.7 percent indicated that they would consider ride sharing if they had to commute longer distances. Seventeen percent indicated that they would be interested in ride sharing if gas was rationed or unavailable.

### Mobile Home Campaign

About 17 percent of the households in the survey indicated that they currently live in a mobile home. This implies that approximately 48,500 Montana households currently reside in mobile homes. The following highlights summarize the findings of the questions asked of mobile home owners (households):

- About three-fourths of the mobile home households are owners-- the remaining one-fourth rent the trailer.
- About one-third of the mobile home owners thought that their home was as energy efficient as it could be. Approximately 40 percent indicated some improvement could be made and about two in ten believed that there was room for a lot of improvement.
- A majority of the mobile home owners had taken some energy conservation measures prior to October, 1983. However, only 20 percent re-insulated, while about one-third had added storm doors or windows to the trailers.
- About one-third of the owners had seen the television advertisement concerning mobile home weatherization. Combining the respondents' lack of familiarity with the DNRC energy activities with the respondents' inability to correctly identify the DNRC as the advertising sponsor, it appears that the DNRC's image may be intermixed with the utility companies. In other words, the DNRC does not seem to have a stand-alone image for their energy education activities.



- Very few of the mobile home owners in Montana remember hearing the radio advertisements concerning mobile home energy conservation.
- Given these results, energy conservation advertising for mobile home owners would probably be better accomplished by direct mailing lists or through other methods such as distribution of booklets at information centers, public libraries, and fairs.



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## I. INTRODUCTION

The Montana Department of Natural Resources and Conservation (DNRC) conducted public advertising campaigns in 1983-84 to promote energy conservation through weatherization of mobile homes and insulation of hot water heaters. To determine the success of these campaigns and to estimate the amount of energy saved through conservation, the DNRC contracted with Economic Consultants Northwest (ECN) to conduct a random, statewide telephone survey of the general public. In addition to determining energy conservation awareness and measures implemented relative to mobile homes and hot water heaters, the survey was designed to gather baseline data to determine the extent of ride sharing as an energy conservation measure in 1978, 1983, and 1984.

This report presents the methods used to conduct the survey and the survey results. Appendix A contains the survey instrument used to conduct the interviews, Appendix B shows the geographic distribution of completed telephone interviews, and Appendix C presents the sample size calculations. The supplement to this report contains all frequency distributions.



## II. SURVEY DESIGN

Telephone interviews were conducted with 430 Montanans between September and October 1984 to gather information on domestic hot water heater efficiency, ride sharing activities, and mobile home energy conservation measures. A sample size of 430 was selected in order to estimate proportions within less than 5 percent with a probability of 95 percent. (See Appendix C for sample size calculations.) This sample size, error rate, and probability level selection are consistent with the resources available to sample and report on each of the three aforementioned subject areas.

The survey was conducted between 5 p.m. and 9 p.m. Monday through Friday, and between 10 a.m. and 5 p.m. on Saturday. All telephone calls were made in a centralized area (ECN office). Using a centralized survey area serves the dual purpose of allowing the supervisor to answer respondents' questions and to detect and correct any interviewer bias.

### A. Sampling Design

The sampling design for the survey was developed using a modified version of random digit dialing. Specifically, the total sample was distributed among the three-digit exchange codes in Montana using proportional allocation to hookups in each area (see Appendix A). Then, within each three-digit exchange an appropriate set of usable telephone numbers were randomly selected and the sample numbers were obtained by adding a random value. When a number did not result in a completed call, another respondent was obtained by adding ten to the unsuccessful number.

Because of Montana's rural environment, this type of sampling plan is more efficient than other versions of random digit dialing. It not only



results in good regional coverage of the state based on cities, towns, and rural populations, but also gives individuals with newly listed and unlisted numbers an equal chance for participation in the survey.

#### B. Questionnaire Design

The questionnaire was divided into three major sections (see Appendix B). Section A was concerned with energy conservation measures to lower domestic hot water expenses. Section B focused on ride sharing and factors which may encourage more widespread participation in this practice. Section C was designed to determine the status of mobile home energy conservation measures.

The interview questions were primarily close-ended (i.e., answer choices were provided) to facilitate statistical comparisons and to reduce bias in coding responses. Open-ended responses require that interpretations be made by the analyst in order to place variable responses into categories to allow for comparisons. Such interpretations introduce bias and may not accurately reflect respondents' views of the survey subject.

The length of the questionnaire was an important factor considered in the questionnaire design. A relatively short interview (less than five minutes in length) was designed because research has found that lengthy interviews can decrease the quality of information obtained if respondents choose answers quickly to end the interview sooner.

Questions concerning respondents' age, income, education, and so forth (i.e., demographic questions) are often asked of survey participants to determine whether certain responses can be systematically linked to these demographic characteristics. Because this survey was mostly concerned with responses from households and not individuals, no demographic questions were necessary.



Pretesting, a necessary element in identifying questionnaire problems, was divided into the following three stages:

1) The draft questionnaire was critiqued by individuals who either understood the study and are experienced in survey design.

2) The draft questionnaire was administered to a small segment of the general public.

3) After the draft questionnaire was administered to the general public, the interviewers discussed each question and made suggestions for improvement.

Revisions in the questionnaire were made accordingly to reflect various problems and/or criticisms.

### C. Data Analysis

After all interviews had been conducted, the data was keyed onto a preformatted record and verified. Following automation, a statistical package was used to generate frequency distributions and cross-tabulations (see Appendix C).

The 95% confidence limits for each proportion of households from the sample having a particular characteristic are estimated using the following normal approximation.

$$Pr \pm SE * 1.96 + 1/2n$$

Where Pr = Proportion of Households Having Characteristic r  
 SE = Standard Error of the Estimate  
 1.96 Normal Deviate Corresponding to .95 Probability  
 1/2n = Continuity Correction for Sample of Size n



For this survey:

$$SE = ((1 - n/N) * P * (1 - P)/(n - 1))^{1/2}$$

Where for maximum possible error  $P = .5$

$N =$  Population Size (285,000 households)

$n =$  Sample Size (430)

Then the 95% confidence limits are

$$Pr \pm ((1 - 430/285,000) * .5 * .5/429)^{1/2} * 1.96 + 1/860$$

or

$$Pr \pm .02412 * 1.96 + .001$$

$$Pr \pm .048$$

This implies that 95% of the time the true population proportion will fall in the interval  $Pr \pm .048$ .



### III. SURVEY RESULTS

The purpose of this study was to gather information on Montanan's energy conservation activities with respect to domestic hot water efficiency, ride sharing, and mobile home weatherization. This information will provide data to measure the effectiveness of two advertising campaigns (hot water use and mobile home) conducted by the DNRC, and will provide baseline data for the ride sharing activities of Montanans. The following narrative describes the survey results (see the supplement to the report for frequency distributions of all questions).

#### A. Domestic Hot Water Use

Hot water heating is the second highest energy user in a typical home. One method of improving the efficiency of the hot water heater is to reduce stand-by energy losses.<sup>1</sup> Reducing energy costs associated with hot water use can be accomplished by insulating the hot water heater and by lowering the temperature setting on the hot water heater to 120°F.

Thirty-nine percent of the respondents indicated that they had wrapped either their hot water heater or pipes with an insulating material. In a statewide telephone survey conducted in 1982, it was found that 33.3 percent had wrapped their hot water heater or pipes with insulation.<sup>2</sup> From this data, it appears there is a slight, but probably not significant, increase in the number of persons wrapping their hot water heater or pipes

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<sup>1</sup>Stand-by energy loss is the heat that is lost which radiates continuously from the hot water heater walls to the surrounding walls.

<sup>2</sup>ECO Northwest, Ltd. of Helena, Montana, conducted a general public energy conservation survey for the Montana Department of Natural Resources and Conservation. Sample size for this survey was 601.



with insulation. Of those households who had not yet wrapped their heater or pipes (60.5 percent), 26.3 percent indicated that they plan to do so, and 70.6 percent indicated that they had no plans to wrap their hot water heater in the future. By comparison, in the 1982 survey, only 4.7 percent planned to wrap their hot water heater or pipes with an insulating material. This indicates a significant increase in the number of persons planning to insulate their pipes or hot water heater.

In spite of the cost effectiveness of wrapping hot water heaters with insulating materials, the majority of respondents (70.6 percent) who had not yet wrapped their heater or pipe indicated they had no plans to do so. Table 1 presents the reasons why the respondents do not plan to wrap their hot water or pipes with an insulating material. The most common reason for "no action" was that "the warmth given off by the hot water heater adds heat to some parts of my house." With regard to open-ended responses, many of the respondents mentioned that they had taken no action because: they rent<sup>3</sup> and believe it is the landlord's responsibility, cannot get at pipes, too inconvenient, never thought about it, and water heater is already energy efficient.

Last winter the DNRC sponsored a television advertisement which demonstrated someone wrapping a hot water heater with blanket insulation. When the respondents were asked whether they had watched this advertisement 45.8 percent (197 respondents) indicated that they had seen the commercial. Although 15.7 percent (31 respondents) of those who had viewed the advertisement thought they knew the name of the sponsor, none of them correctly

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<sup>3</sup>The 1980 Montana Census reported that approximately 20 percent of Montanans rent the dwellings in which they reside.



TABLE 1

REASONS WHY RESPONDENTS DO NOT HAVE PLANS  
TO WRAP HOT WATER HEATER OR PIPES WITH INSULATING MATERIAL

<u>Reason</u>	<u>Percent of Respondents</u>
Do Not Have Time to Wrap Them	4.9
Was Not Aware That This Would Save Money	6.5
The Warmth Given Off by My Hot Water Heater Adds Heat to Some Parts of My House	30.8
Do Not Want to Spend The Money on the Insulating Material	7.6
Other*	50.2
	n = 185

\*Other reasons specified by respondents included:

- 1) They rented; therefore, it was the landlord's responsibility.
- 2) Can't get to pipes.
- 3) Too inconvenient.
- 4) Never thought about it.
- 5) My heater is energy efficient.



named the DNRC. Most of the respondents indicated that the commercial was sponsored by the Montana Power Company (54.8 percent) or Montana-Dakota Utilities (35.5 percent).

Of the 197 survey participants remembering the television advertisement, 5.6 percent (11 respondents) insulated their heater or pipes as a result of the campaign. Additionally, 20.3 percent (40 respondents) reported that they lowered the temperature on their hot water heater as a result of the television advertisement.

The DNRC published the booklet "Hot Water—Insulate and Save" during their 1983-84 domestic hot water conservation campaign. These booklets were offered free of charge to the public at such places as local improvement centers, hardware stores, lumber yards, and upon request to the DNRC. Approximately 7 percent indicated that they had read this booklet. Table 2 shows where the respondents obtained the pamphlet. Most of the 31 respondents had obtained the booklet from either a home building center or local fair/energy show.

The respondents were asked if they had taken energy actions as a result of reading the booklet (see Table 3). About one-third had either lowered the hot water heater temperature or installed a water flow restrictor in the shower. Only one person had wrapped the hot water heater or pipes with an insulating material.

The final question in the domestic hot water use section was concerned with the survey participants' familiarity with the DNRC's public energy education activities. The majority of the respondents (71.6 percent or 308 respondents) were not familiar, 25.4 percent (109 respondents) were somewhat familiar, and 3.0 percent (13 respondents) were very familiar with the DNRC's energy activities.



TABLE 2

PLACES WHERE RESPONDENTS OBTAINED  
THE BOOKLET "HOT WATER—INSULATE AND SAVE"

<u>Place of Business</u>	<u>Percent of Respondents</u>
At a Local Home Improvement Center, Hardware Store, or Lumber Yard	29.0
From a Booth at a Local Fair or Home Energy Show	25.8
Directly Requested and/or Received by Mail	9.7
From Another Source*	35.5
	n = 31

\*Other sources where respondents obtained the booklet were not specified.



TABLE 3  
 ENERGY ACTIONS TAKEN BY RESPONDENTS\*  
 AS A RESULT OF READING BOOKLET  
 "HOT WATER—INSULATE AND SAVE"

<u>Energy Action</u>	<u>Percent of Respondents</u>		<u>Percent of Total Population</u>
	<u>Did Take Action</u>	<u>Did not take Action</u>	
Wrapped Hot Water Heater or Pipes With an Insulating Material	3.2	96.8	0.2
Lowered Hot Water Heater Thermostat	29.0	71.0	2.1
Installed Water Flow Restrictor in the Shower	32.3	67.7	2.3
	n = 20		n = 430

\*Respondents refers to the 7.2 percent that read the booklet "Hot Water—Insulate and Save."



## B. Ride Sharing

Approximately 23 percent of all respondents indicated that they or someone in their household currently ride share<sup>4</sup> to work or college. Forty-two percent of these ride sharers indicated that they travel less than 5 miles one-way to work or college, 26 percent travel 5 to 15 miles, and 32 percent travel more than 15 miles one-way. One-half reported that they ride or drive with someone working in the same vicinity, while 38 percent indicated that they ride share with a family member. The remaining 12 percent reported various reasons for ride sharing which included they ride share with both a family member and someone working in the vicinity and they ride share with a fellow student.

Forty-nine percent of the ride sharers indicated that there were generally two people per vehicle, 29 percent rode with three people, and 22 percent reported four or more persons per automobile. Given this distribution, the average (weighted) number of riders is approximately 2.8 per vehicle.

When the 1984 ride sharers were asked whether they or anyone in their household ride shared in 1978 and 1983, approximately one-third reported they ride shared in 1978 and 80 percent were ride sharing in 1983. In comparison, of those respondents who are not current ride sharers, 14 percent indicated that they did ride share in 1978 and by 1983, this proportion had declined to 5 percent (see Table 4). Some of the reasons provided by the non-ride sharers for why they stopped ride sharing in either 1978 or 1983 included they had: moved, retired, graduated from college, changed or quit job, and ride sharer had moved.

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<sup>4</sup>For purposes of this study, ride sharing was defined to the survey participants as "riding in a motor vehicle with an adult, 2 or more times a week for a period of 6 weeks or more."



TABLE 4  
RESPONDENTS' RIDE SHARING ACTIVITIES  
IN 1978, 1983, AND 1984

<u>Year</u>	<u>Current Ride Sharers</u>	<u>Current Non-ride Sharers</u>	<u>Total of All Respondents</u>
1984	23.3%	0.0%	23.3%
1983	34.0%	13.9%	22.3%
1978	80.0%	4.9%	18.6%
	n = 100	n = 330	n = 430



When combining the responses of the current rider sharer and non-rider sharer groups with regard to their past (1978 and 1983) ride sharing activities, it was found that 19 percent of all respondents reported ride sharing in 1978, 22 percent in 1983, and 23 percent today. Given the accuracy of the sample, it would appear that ride sharing frequency has remained stable for the past five years.

The respondents were provided with several examples of situations in which they would be interested in ride sharing (see Table 5). The most common circumstance under which the 330 non-rider sharers would consider ride sharing was if they moved and had to commute a longer distance to work or school. Some of the respondents explained they were not interested in ride sharing under any circumstances, while others indicated they were retired or farmers/ranchers and had no need to seek a ride sharing arrangement.

### C. Mobile Homes

Mobile homes manufactured in the United States after June 15, 1976, must meet the U.S. Department of Housing and Urban Development's Mobile Construction and Safety Standards Code. Meeting these standards has resulted in the manufacturing of more energy efficient mobile homes. Of the 56 mobile home owners participating in this survey, 48.2 percent (27 respondents) reported their mobile home was built during or after 1976.

Approximately 36 percent (20 respondents) thought their mobile home was about as energy efficient as it could be, 42.9 percent (24 respondents) thought some improvement could be made, and 21.4 percent (12 respondents) believed a lot of improvement could be made to increase the energy efficiency of their mobile home. Table 6 presents the type of energy



TABLE 5  
SITUATIONS IN WHICH NON-RIDE SHARERS  
MAY BE INTERESTED IN RIDE SHARING

<u>Situation</u>	<u>Percent of Respondents*</u>
If the Price of Gasoline Increases	15.5
If a Vehicle to be Used for Ride Sharing Could be Purchased Using an Interest-free Loan	9.1
If Your Employer or School Developed and Offered a Carpool Service	12.7
If Your Personal Car Became Unreliable	14.2
If Gas was Rationed or Unavailable	17.3
If You Moved and had to Travel Longer Distances to Work or School	26.7
Other**	59.1
	n = 330

Notes: \*The question asked the respondents to indicate situations in which they would be interested in ride sharing; therefore, the respondents could have answered in more than one category. The percent is based on the total number of non-ride sharing respondents (330).

\*\*Other situations specified by the non-ride sharers included:

- 1) Retired.
- 2) Walks to work.
- 3) Needs own vehicle on job.
- 4) Farms or ranches.
- 5) Scheduling problem.
- 6) Self-employed.
- 7) Lives too far to ride share with another person.
- 8) Not interested.



conservation actions that respondents had taken before the DNRC mobile home energy campaign in October 1983. Leveling and skirting the trailer were the most common actions taken by respondents, while re-insulating siding or roofing was the least common response.

In late 1983, the DNRC sponsored an advertisement on television concerning mobile home weatherization. Although 33.9 percent of the 56 mobile home owners remembered viewing this advertisement, only 10.5 percent (two respondents) reported they knew the name of the sponsor of the advertisement. When asked to specify the sponsor's name, one respondent answered correctly (DNRC) and the other thought the sponsor was the Montana Power Company.

Twenty-one percent (four respondents) took energy conservation measures as a result of the mobile home weatherization advertisement on television. One survey participant leveled the trailer, two had caulked and weatherstripped windows and/or doors, one had added storm doors, and one had re-insulated the siding or roofing.

In addition to the television advertisement, the DNRC sponsored two radio advertisements concerning mobile home conservation measures. Four respondents had listened to the commercial in which a retired gentleman talked about weatherizing his mobile home and three survey participants had heard the commercial in which the wife of a couple expecting a baby talked about taking energy conservation actions in their mobile home. Only one respondent remembered the sponsor of the radio advertisement, but indicated that the sponsor was Montana-Dakota Utilities. None of the respondents who had remembered the advertisements took any energy conservation measures as a result of either radio commercial.



TABLE 6  
 CONSERVATION ACTIONS TAKEN BY MOBILE  
 HOME OWNERS BEFORE OCTOBER 1983

<u>Conservation Action</u>	<u>Percent of Respondents</u>
Leveled Trailer	78.5
Skirted Trailer	80.4
Caulked and Weatherstripped Windows and/or Doors	57.1
Added Storm Doors or Windows	35.7
Re-insulated Siding or Roofing	19.6
Cleaned or Adjusted Furnace	58.9
	n = 56

Note: The question asked the respondents to indicate all the conservation actions they had taken before October 1983; therefore, the respondents could have answered in more than one category. The percent is based on the total number of mobile home owner respondents (56).



In June 1984, the DNRC published a booklet entitled "Mobile Home Energy Savings." The booklet focused on measures that mobile home dwellers could take to improve the energy efficiency of their mobile home. Two respondents had read this booklet and one of these respondents had re-insulated the trailer siding or roofing as a result of reading this booklet, while the other respondent took no action. Some of the respondents asked where they could obtain the booklet, and the interviewers provided them with the address of the DNRC.

Many of the mobile home owners had already taken many of the conservation measures before the DNRC mobile home campaign, which may explain the lack of "no action" as a result of watching or listening to the commercials. For example, prior to October 1983, 80 percent had skirted their trailer, 79 percent had leveled their trailer, 59 percent had cleaned or adjusted the furnace, and 57 percent had caulked and weatherstripped the windows and/or doors of their mobile home. Very few additional comments were offered by the mobile home owners. One respondent, however, stated that:

Newer mobile homes are better energy efficient than older ones--cost almost prohibitive to redo an older one.

This respondent was correct in thinking that newer (i.e., after 1976) mobile homes are more energy efficient, but wrong in thinking there were no ways to reduce the amount of energy the household uses.

Another respondent provided information on a way that she conserves energy. The respondent explained that she uses a metal trough-like fixture extending from the siding where she piles dirt, plants flowers, and leaves an air space at each end. This method, she believes, keeps the lower side of the trailer draft-free, thus, conserving energy.



#### D. Summary

The overall results of the telephone interviews indicated that the survey participants were relatively unaware of the DNRC's energy education activities. The majority of respondents reported not being familiar with the DNRC functions and many confused the DNRC energy conservation campaign efforts (i.e., television and radio advertisements) with those of public utility companies.

Based on the survey data, television advertising appears to be an effective way to reach the public concerning energy conservation measures. Approximately 46 percent remembered viewing the hot water wrap television commercial and about 34 percent of the mobile home owners watched the mobile home weatherization advertisement.

Ride sharing trends in Montana are difficult to analyze with the existing data base. From these survey results, however, it appears that ride sharing activities have remained relatively stable since 1978. Circumstances that may increase ride sharing activities as reported by the respondents are if they moved and had to travel longer distances to work, if gasoline was rationed, and if the price of gasoline increased. There are, however, situations in which ride sharing would not be likely such as retired persons, farmers/ranchers, or persons using a vehicle while on the job have little or no need to ride share.



APPENDIX A  
QUESTIONNAIRE



DNRC ENERGY CONSERVATION  
FOLLOW-UP QUESTIONNAIRE

INTRODUCTION: This is \_\_\_\_\_ calling for the Montana Department of Natural Resources. We are conducting a statewide survey concerning energy conservation actions. Could I take a few minutes of your time to ask some questions? All answers you may provide will be kept confidential.

A. HOT WATER USE

I would like to ask you a few questions about hot water use in your home.

Q-1 Have you wrapped your hot water heater or pipes with an insulating material?

- 1) YES -- SKIP TO Q-4 (21)
- 2) NO

Q-2 Do you plan to do so in the future?

- 1) YES -- SKIP TO Q-4 (22)
- 2) NO

Q-3 Which of the following reasons best describes why you do not plan to wrap your hot water heater or pipes? (Choose one.)

- 1) DO NOT HAVE TIME TO WRAP THEM.
- 2) WAS NOT AWARE THAT THIS WOULD SAVE MONEY.
- 3) THE WARMTH GIVEN OFF BY MY HOT WATER HEATER ADDS HEAT TO SOME PARTS OF MY HOUSE. (23)
- 4) DO NOT WANT TO SPEND THE MONEY ON THE INSULATING MATERIAL.
- 5) OTHER: SPECIFY \_\_\_\_\_



- Q-4 Did you see the TV advertisement last winter showing someone wrapping his hot water heater with blanket insulation?
- 1) YES (24)
  - 2) NO -- SKIP TO Q-7
- Q-5 Do you remember the name of the sponsor of the TV advertisement?
- 1) YES: SPECIFY \_\_\_\_\_ (25)
  - 2) NO
- Q-6 Have you taken any of the following actions as a result of this TV advertisement?
- 1) WRAPPED HOT WATER HEATER OR PIPES WITH AN INSULATING MATERIAL. (26)
  - 2) LOWERED HOT WATER HEATER THERMOSTAT. (27)
- Q-7 Have you read the booklet called "Hot Water -- Insulate and Save"?
- 1) YES (28)
  - 2) NO -- SKIP TO Q-10
- Q-8 Which of the following statements best describes how you obtained the booklet? (Choose one.)
- 1) AT A LOCAL HOME IMPROVEMENT CENTER, HARDWARE STORE, OR LUMBER YARD.
  - 2) FROM A BOOTH AT A LOCAL FAIR OR HOME ENERGY SHOW. (29)
  - 3) DIRECTLY REQUESTED AND/OR RECEIVED BY MAIL.
  - 4) FROM ANOTHER SOURCE.



Q-9 Have you taken any of the following actions as a result of reading this booklet?

- 1) WRAPPED HOT WATER HEATER OR  
PIPES WITH AN INSULATING  
MATERIAL. (30)
- 2) LOWERED HOT WATER HEATER  
THERMOSTAT. (31)
- 3) INSTALLED WATER FLOW  
RESTRICTOR IN THE SHOWER. (32)

Q-10 The Energy Division of Montana Department of Natural Resources sponsors public energy education activities. Are you very familiar, somewhat familiar, or not familiar with these activities?

- 1) VERY FAMILIAR
- 2) SOMEWHAT FAMILIAR (33)
- 3) NOT FAMILIAR



B. RIDE SHARING

Now I would like to ask you some questions about ride sharing. We are defining ride sharing as riding in a motor vehicle with an adult, 2 or more times a week for a period of 6 weeks or more.

Q-11 During 1984, have you or anyone else in your household normally shared a ride to work or college?

1) YES

(34)

2) NO -- SKIP TO Q-16

Q-12 How many miles one way did you or this person travel?

1) 5 MILES OR LESS ONE WAY

2) 5 TO 15 MILES ONE WAY

(35)

3) MORE THAN 15 MILES ONE WAY

Q-13 Which of the following statements best describes how you or this person normally ride shared?

1) DRIVE OR RIDE WITH FAMILY MEMBER.

2) DRIVE OR RIDE WITH SOMEONE WORKING IN THE SAME VICINITY.

(36)

3) OTHER: SPECIFY \_\_\_\_\_

Q-14 How many people including the ridesharer normally traveled in the car to and from work or college?

1) 2

2) 3

(37)

3) 4 OR MORE



Q-15 Did you or anyone in your household ride share to work or college:

1) IN 1978? (38)

2) IN 1983? (39)

SKIP TO SECTION C: MOBILE HOME CAMPAIGN

Q-16 In which of the following situations do you think you would be interested in ride sharing?

1) IF THE PRICE OF GASOLINE INCREASES. (40)

2) IF A VEHICLE TO BE USED FOR RIDE SHARING COULD BE PURCHASED USING AN INTEREST-FREE LOAN. (41)

3) IF YOUR EMPLOYER OR SCHOOL DEVELOPED AND OFFERED A CARPOOL SERVICE. (42)

4) IF YOUR PERSONAL CAR BECAME UNRELIABLE. (43)

5) IF GAS WAS RATIONED OR UNAVAILABLE. (44)

6) IF YOU MOVED AND HAD TO TRAVEL LONGER DISTANCES TO WORK OR SCHOOL. (45)

7) OTHER: SPECIFY \_\_\_\_\_ (46)



Q-17 Did you or anyone in your household ride share to work or college:

1) IN 1978? If NONE, SKIP TO (47)

MOBILE HOME

2) IN 1983? CAMPAIGN (48)

Q-18 Why did you stop ride sharing?



C. MOBILE HOME CAMPAIGN

The last set of questions is about mobile homes.

Q-19 Do you live in a mobile home?

- 1) YES (49)
- 2) NO -- END SURVEY

Q-20 Do you own or rent your mobile home?

- 1) OWN (50)
- 2) RENT -- END SURVEY

Q-21 Was your mobile home built before or after 1976?

- 1) BEFORE 1976 (51)
- 2) AFTER 1976

Q-22 Which of the following statements best describes how you feel about the energy efficiency of your mobile home? My mobile home is:

- 1) ABOUT AS ENERGY EFFICIENT AS IT CAN BE.
- 2) SOME IMPROVEMENT COULD BE MADE. (52)
- 3) A LOT OF IMPROVEMENT COULD BE MADE.

Q-23 Did you take any of the following conservation actions BEFORE October 1983?

- 1) LEVELED TRAILER (53)
- 2) SKIRTED TRAILER (54)
- 3) CAULKED AND WEATHERSTRIPPED  
WINDOWS AND/OR DOORS (55)
- 4) ADDED STORM DOORS OR  
WINDOWS (56)
- 5) RE-INSULATED SIDING OR ROOFING (57)
- 6) CLEANED OR ADJUSTED THE FURNACE (58)



- Q-24 Did you see the advertisement on TV in late 1983 showing a young couple expecting a baby who were weatherizing their mobile home?
- 1) YES (59)
  - 2) NO -- SKIP TO Q-28
- Q-25 Do you remember the sponsor of this TV advertisement?
- 1) YES: SPECIFY \_\_\_\_\_ (60)
  - 2) NO
- Q-26 Did you take any energy conservation actions as a result of this TV advertisement?
- 1) YES (61)
  - 2) NO — SKIP TO Q-28
- Q-27 Which of the following actions would you say that you did as a result of this TV advertisement?
- 1) LEVELED TRAILER (62)
  - 2) SKIRTED TRAILER (63)
  - 3) CAULKED AND WEATHERSTRIPPED  
WINDOWS AND/OR DOORS (64)
  - 4) ADDED STORM DOORS OR  
WINDOWS (65)
  - 5) RE-INSULATED SIDING OR ROOFING (66)
  - 6) CLEANED OR ADJUSTED THE FURNACE (67)



Q-28 In late 1983, there were two radio advertisements concerning mobile home conservation measures. I am going to read a statement describing each advertisement and I would like you to tell me whether you remember either of the advertisements.

- 1) A COMMERCIAL IN WHICH A RETIRED GENTLEMAN TALKS ABOUT WEATHERIZING HIS MOBILE HOME IN ORDER TO SAVE MONEY AND ENERGY. If NONE, SKIP TO Q-32 (68)
- 2) A COMMERCIAL WHERE THE WIFE OF A COUPLE EXPECTING A BABY TALKS ABOUT TAKING ENERGY CONSERVATION ACTIONS. (69)

Q-29 Do you remember the sponsor of the radio advertisements?

- 1) YES: SPECIFY \_\_\_\_\_ (70)
- 2) NO

Q-30 Did you take any energy conservation actions as a result of either of these radio advertisements?

- 1) YES (71)
- 2) NO — SKIP TO Q-32



Q-31 Did you take any of the following actions as a result of hearing the radio advertisements?

- 1) LEVELED TRAILER (72)
- 2) SKIRTED TRAILER (73)
- 3) CAULKED AND WEATHERSTRIPPED ,  
WINDOWS AND/OR DOORS (74)
- 4) ADDED STORM DOORS OR  
WINDOWS (75)
- 5) RE-INSULATED SIDING OR ROOFING (76)
- 6) CLEANED OR ADJUSTED THE FURNACE (77)

Q-32 Have you read the booklet called "Mobile Home Energy Savings"?

- 1) YES (78)
- 2) NO -- END SURVEY

Q-33 Did you take any energy conservation actions as a result of reading the booklet?

- 1) YES (79)
- 2) NO -- END SURVEY



Q-34 Did you take any of the following actions as a result of reading the booklet?

- |   |      |
|---|------|
| 1)    LEVELED TRAILER                                     | (80) |
| 2)    SKIRTED TRAILER                                     | (81) |
| 3)    CAULKED AND WEATHERSTRIPPED<br>WINDOWS AND/OR DOORS | (82) |
| 4)    ADDED STORM DOORS OR<br>WINDOWS                     | (83) |
| 5)    RE-INSULATED SIDING OR ROOFING                      | (84) |
| 6)    CLEANED OR ADJUSTED THE FURNACE                     | (85) |

END SURVEY.

Are there any comments you would like to add about energy conservation in the home?

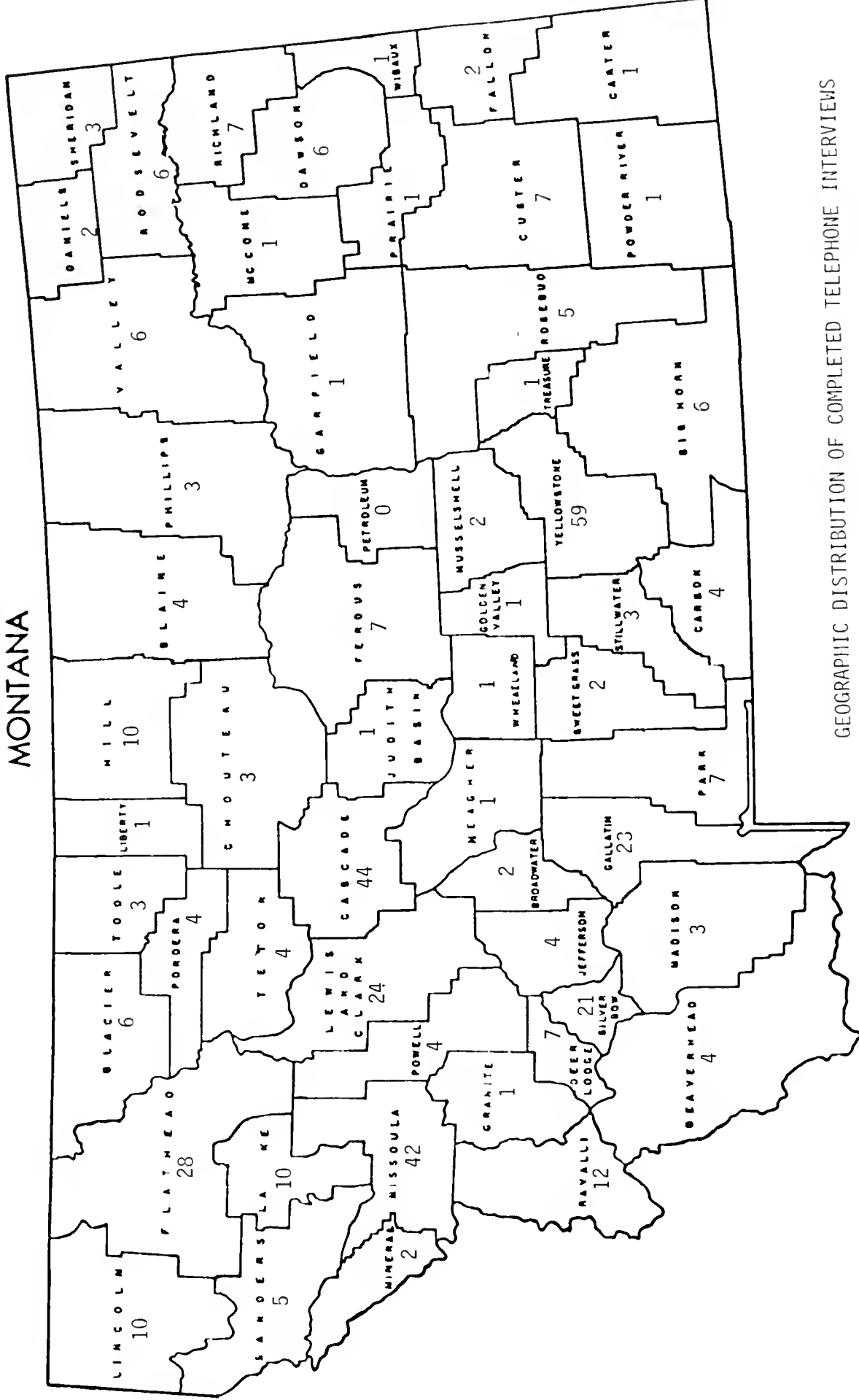
Thank you very much for participating in this survey.



APPENDIX B  
GEOGRAPHIC DISTRIBUTION  
OF INTERVIEWS



# MONTANA



GEOGRAPHIC DISTRIBUTION OF COMPLETED TELEPHONE INTERVIEWS



APPENDIX C  
SAMPLE SIZE CALCULATIONS



## APPENDIX C

### CALCULATION OF SAMPLE SIZE

Use the formula:

$$n_1 = \frac{t^2 pq}{d^2}$$

where

$n_1$  = Sample size (Finite population, no correction)  
 $t$  = Abscissa of normal curve corresponding to probability level  
 $d$  = Error rate  
 $p$  = Estimated proportion  
 $q$  =  $1 - p$

To correct for finite populations, we use:

$$n = n_1 / (1 + (n_1/N))$$

where

$n_1$  is defined above

$N$  is population being sampled

For our example:

$t = 1.96$  (corresponding to .95 probability)  
 $d = .047$  (slightly less than 5%)  
 $p = .5$  (gives maximum sample size)  
 $q = .5$   
 $N = 285,000$  households

so

$$n_1 = \frac{(1.96)^2 (.5) (.5)}{(.047)^2} = 435$$

and

$$n = 435 / (1 + 435/285,000) = 434$$

and rounded to the nearest 10 households

$$n = 430$$





